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09/622,931	11/13/2000	Yoshiki Nakagawa	1581/00210	5489

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EXAMINER

ZALUKAEVA, TATYANA

ART UNIT

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1713

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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/622,931	NAKAGAWA ET AL.
	Examiner	Art Unit
	Tatyana Zalukaeva	1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
 THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on 13 November 2000.

2a) This action is FINAL.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1-34 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-34 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5

4) Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_

5) Notice of Informal Patent Application (PTO-152)

6) Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 11-14 and 33 and 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recited "obtainable" renders claims indefinite, because undue experimentation is involved to determine boundaries of protection. This rationale is applicable to polymer "obtainable" by a stated process because any variation in any parameter within the scope of the claimed process would change the polymer produced. One who made or used a polymer made by a process other than the process cited in the claim would have to produce a polymer using all possible parameters within the scope of the claim, and then extensively analyze each product to determine if this polymer was obtainable by a process within the scope of the claimed process, Ex parte Tanksley, 26 USPQ 2d 1389.

The recited dependency in claim 33 is indefinite because it is not readily ascertainable as to what the claim is referred to in terms of its dependency.

***Specification***

3. Claims 15 and 16 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 15 and 16 fail to further limit claim 1.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 7, 15, 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 06329720.

6.

JP'720 discloses a new high-purity polyethylene macromonomer which has a **terminal (meth)acryloyl** group and can be copolymerized with another vinyl monomer to give a comb-type graft polymer suitable as a polymer blend compatibilizer, a **surface modifier, etc.** In order to obtain such polymer ethylene is subjected to living polymn. using a 1-6C linear or branched **alkyllithium/tert diamine initiator**, reacted

with a specific carbonyl compound or oxidized with oxygen, and reacted with a **(meth)acrylic acid halide** to give a polyethylene macromonomer of the formula



wherein R1 is a 1-6C linear or branched saturated hydrocarbon group; R2 and R3 are each H or a 1-18C aliphatic or aromatic hydrocarbon group provided R1, R2, and R3 are the same or different from each other; R4 is H or methyl; and n is an integer of 10-1,000. With n, which is a degree of polymerization ranging from 1-10,000, the limitation for a molecular weight is inherently met by JP'720.

Thus all the limitations of the instant claims 1-3, 7, 15, 16 and 17 either explicitly or inherently met by the disclosure of JP'720.

7. Claims 1-3, 13, 15-29, 22, 28 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. 5,242,983 to Kennedy et al.

Kennedy discloses a polymeric composition comprising poly(methyl methacrylate) **cross-linked** by copolymerization with **tris(.omega.-methacryloyl polyisobutylene**. A powder is formed from the composition, and the final cement is prepared by mixing the powder with additional methyl methacrylate in the presence of a catalyst to form a dough-like material that is polymerized *in situ* to yield a cement useful for orthopedic purposes (see abstract).

It has been shown by Kennedy that the molecular weight of the **methacryloyl**

telechelic polyisobutylenes should be controlled within particular limits if optimal physical properties between about 6,000 to about 25,000 grams per gram mole (col. 5, lines 20-26)

In addition, it is necessary that the molecular weight distribution of the acryloyl telechelic polyisobutylene, be maintained within a uniform range. M.w /Mn, of these compounds does not exceed 1.5, preferably from about 1.2 to about 1.3 (col. 5, lines 28-54).

In preparing a composition of a polymethyl methacrylate with telechelic polyisobutylene Kennedy utilizes N,N-dimethyl p-toluidine as an accelerator, hydroquinone as a stabilizer and benzoyl peroxide as a polymerization catalyst. (col.7, lines 40-45 and Table 1).

With specific regard to claim 13 Kennedy discloses a methodology of preparation of a telechelic polymer, by first preparing a polyisobutylene, (col. 9, lines 30-47), then functionalizing the said polymer to obtain a hydroxyterminated polyisobutylene, which is in details described in col. 10, lines 25-60, and further reacting such hydroxyterminated polyisobutylene with methacryloyl chloride (col. 10, lines 63-68, col. 11, lines 1-16) to obtain a methacryloyl terminated polyisobutylene.

Thus all the limitations of the above claims are met by the disclosure of Kennedy.

8. Claims 1-6, 11, 13-20, 22, 23, and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Randen et al (U.S. 5,604,268) .

Randen discloses an adhesive composition comprising functionally reactive macromers, which are prepared from the corresponding telechelic prepolymers of, for example, octadecyl acrylate (ODA), behenyl acrylate (BeA) and mixtures of tetradecyl acrylate (TDA), and a variety of other acrylates and acrylic esters. (col. 5, lines 46-55).

Macromers with calculated molecular weights of 2500, 5000, 11,000 and 20,000 g/mole for ODA and macromers of BeA with calculated molecular weights of 4500 and 11,000 have been prepared (col. 5, lines 58-65). The hydroxyterminated telechelic polymers were then functionalized with acryloyl chloride(ACI), methacryloyl chloride(MACI), 2'-isocyanatoethyl methacrylate(IEM), 3-isopropenyl-alpha, alpha-dimethylbenzyl isocyanate(IPDMBI) and the like. (col. 13, lines 1-14)

Example 23a in Table 3 demonstrated the preparation of an ODA hydroxy-terminated, telechelic prepolymer with a calculated molecular weight of approximately 11,000, wherein mercaptoethanol (col. 13, line 21) is used as a chain transfer agent.

Other ODA hydroxy-terminated telechelic prepolymers with calculated molecular weights of approximately 2500, 5000, 7500 and 20,000 g/mole were prepared in the same manner and are shown in Table 3, Examples 20, 21, 22 and 28 respectively. Examples 23c through 27 demonstrated telechelic polymers with varying amounts of ODA homopolymer therein.

#### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 8- 12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over any one of the following: JP'720, Kennedy or Randen, each one individually.

Claims 8-12 are product-by-process claims. Each one of the cited references discloses an acryloyl group end-functional or telechelic vinyl polymers, and

provide different chemical reactions describing functionalization of polymers in order to achieve the desired end-functionality. However, with regard to claim 12 there is no evidence, or no reason to believe that the process of functionalization as instantly claimed in claim 12 produces a different product, that of reaction of JP'720, Kennedy and Randen, consult *In re Thorpe*, 227 USPQ 964 (CAFC 1985), wherein the Examiner rejected product-by-process claims over a product, which although prepared in a different manner, appeared to be the same (prima facie) as the claimed product.

Furthermore, because of the nature of product-by process claims, the Examiner cannot ordinary focus on the precise difference between the claimed product and the disclosed product. It is then Applicants' burden to prove that an unobvious difference exists. See *In re Marosi*, 218 USPQ 289, 292-293 (CAFC 1983).

In the instant case no Graham vs. John Deere analysis was made but rather the test set out in MPEP 706.03(e) and *In re Marosi* was applied while explaining why the claimed product does not patentably distinguish over the prior art under 35 USC 102/103.

See also footnote 11 O.G. Notice 1162 59-61, wherein a 35 USC 102/103 rejection is authorized in the case of product-by-process claims because the exact identity of the claimed product or the prior art product cannot be determined by the Examiner.

13. Claims 6, 8-10, 21, 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matyaszewski (U.S. 5,807,937) alone or over JP'720 in combination with Matyaszewski.

JP'720 discloses a new high-purity polyethylene macromonomer which has a terminal (meth)acryloyl group prepared by living anionic polymerization.

However, JP'720 does not elucidate the specific type of living polymerization, namely atom transfer radical polymerization with the use of specific transitional metal complexes, nor does it specify the aqueous emulsion as a composition containing such polymers.

Matyaszewski discloses a method of atom transfer radical polymerization (ATRP), as a kind of a living polymerization process in particular application to the process of making end functional and telechelic polymers (see abstract, figure 1, col.25, lines 31-35, col. 26, lines 5-56, etc.) Matyaszewski discloses a variety of suitable polymers, including acrylates, methacrylates, styrene and other vinyl polymers, terminated by a variety of functional groups, including acryloyl groups, as can be derived from the meaning of X explained through the whole body of a patent). The range of molecular weights and molecular weight distributions of Matyaszewski's end-functional and telechelic polymers are within the instantly claimed range (see, for example col. 26, lines 44-56)..Metal complex catalyst utilized by Matyaszewski is preferably a copper complex. The end functionality of the copolymers of Matyaszewski can be easily

converted to other functional groups, including acryloyl groups by any conventional and known methods (col. 39, lines 15-25). Polymers can be prepared using water as a medium, utilizing an emulsion polymerization (col. 39, lines 43, 44).

Since both Matyaszewski and JP'720 teach the living radical polymerization of vinyl compounds terminated by acryloyl groups, and since Matyaszewski provides detailed description and mechanism of ATRP, one skilled in the art would have found it obvious to utilize the specificities of Matyaszewski in a living process of JP'720 in order to achieve the advantages of ATRP, such as controllable molecular weight and molecular weight distribution.

14. Claims 19, 24-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over any one of JP'720, Kennedy, Randen or Matyaszewski combined with Fifield (U.S. 5,381,735).

JP '720, Kennedy, Randen and Matyaszewski all disclose acryloyl group end functional vinyl polymers, which are components for curable compositions. However, the above references do not specify photocuring by means of actinic rays or photopolymerization initiators.

Actinic radiation and photoinitiators are well known to those skilled in the art for curing polymeric compositions.

Thus Fifield discloses photopolymerizable composition comprises a photopolymerizable material having ethylenically unsaturated bonds available for

participation in addition (free radical) polymerization. Prepolymers, of Fifield are those having olefinic bonds at the termini of the chain are subsequently further polymerized by use of **actinic radiation**. (col.4, lines 24-35)

The termini of the prepolymer chain are typically "capped" via an ester or carbamoyl (urethane) linkage with an olefinic moiety such as an acrylate or methacrylate. (col. 4, lines 43-46). The composition can be also thermally cured with the use of thermal initiators (col. 7, lines 45-50). Since JP'720, Kennedy, Randen or Matyaszewski suggest curing or crosslinking a composition comprising a polymer having terminal functional group, and Fifield specifies the details of curing process for the similar compositions one skilled in the art would have reasonably expect that the conventionally known techniques of photopolymerization are operable within the scope of JP'720, Kennedy, Randen or Matyaszewski inventions with the reasonable expectation of success.

Therefore, the combination of references renders the above claims *prima facie* obvious and properly rejected under 35 USC 103(a).

### ***Conclusion***

15. Other references cited in PTOL-892 are presented to show the state of the art in end-functional vinylic polymers.

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16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tatyana Zalukaeva whose telephone number is (703) 308-8819. The examiner can normally be reached on 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (703) 308-2450. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

Tatyana Zalukaeva  
Examiner  
Art Unit 1713



TZ  
March 21, 2002